5.11.3.4 Access to the closed landfill shall be limited to those persons who are engaging in activities which are compatible with the intended postclosure use of the site.

5.11.4 Postclosure land use. The owner or operator shall implement the postclosure land use plan approved by the Department.

5.11.5 Notice in Deed to Property

5.11.5.1 The owner of the property on which a sanitary landfill is located must record an environmental covenant, per **Delaware Code** Title 7, Chapter 79, Subchapter II, with the deed to the facility property that will in perpetuity notify any potential purchaser of the property:

5.11.5.1.1 The land has been used as a solid waste disposal site, and

5.11.5.1.2 The use of the land is restricted under this regulation.

5.11.5.2 Included with the notation shall be a map or description clearly specifying the area that was used for disposal.

8 DE Reg. 354 (08/01/04)

11 DE Reg. 807 (12/01/07)

6.0 Industrial Landfills

(NOTE: This section applies to those landfills that dispose of only industrial and/or dry waste. Additional requirements for landfills and surface impoundments containing coal combustion residuals are located in *Section 11.0 - Special Wastes Management, Part 3 - Coal Combustion Residuals*.)

6.1 Siting

6.1.1 Industrial landfill facilities shall be located only in areas where the potential for degradation of the quality of air, land, and water is minimal.

6.1.2 All industrial landfill facilities shall be constructed to at least minimum design requirements as contained in subsection 6.2. More stringent designs will be required where deemed necessary by the Department for the protection of groundwater resources.

6.1.3 No new cell of an industrial landfill shall be located in an area such that solid waste would at any time be deposited:

6.1.3.1 Within the 100 year flood plain as delineated by the Federal Emergency Management Agency.

6.1.3.2 In an area that may cause or contribute to the degradation of any state or federally regulated wetlands unless the owner or operator can demonstrate to the satisfaction of the appropriate wetlands regulatory agency that:

6.1.3.2.1 There is no impact to any regulated wetlands on the site, or

6.1.3.2.2 Any impact will be mitigated as required.

6.1.3.3 Within one mile of any state or federal wildlife refuge, wildlife area, or park, unless specifically exempted from this requirement by the Department.

6.1.3.4 So as to be in conflict with any locally adopted land use plan or zoning requirement.

6.1.3.5 Within the wellhead protection area of a public water supply well or well field or a formally designated aquifer resource protection area.

6.1.3.6 Within 200 feet of a fault that has had displacement during Holocene time (unless it can be demonstrated that a lesser setback distance would prevent damage to the structural integrity of the landfill unit and be protective of human health and the environment).

6.1.3.7 Within a seismic impact zone unless it can be demonstrated that all containment structures, including liners, leachate collection systems, and surface water control systems, are designed to resist the maximum horizontal acceleration in lithified earth material for the site. For the purposes of this section:

6.1.3.7.1 Seismic impact zone means an area with a two (2) percent or greater probability that the maximum horizontal acceleration in lithified earth material, expressed as a percentage of the earth's gravitational pull (g), will exceed 0.10g in 50 years.

6.1.3.7.2 Maximum horizontal acceleration in lithified earth material means the maximum expected horizontal acceleration depicted on a seismic hazard map, with a 98 percent or greater probability that the acceleration will not be exceeded in 50 years, or the maximum expected horizontal acceleration based on a site-specific seismic risk assessment.

6.1.3.7.3 Lithified earth material means all rock, including all naturally occurring and naturally formed aggregates or masses of minerals or small particles of older rock that formed by crystallization of magma or by induration of loose sediments. This term does not include man-made materials, such as fill, concrete and asphalt or unconsolidated earth materials, soil or regolith lying at or near the earth surface.

6.1.3.8 In unstable areas, unless engineering measures have been incorporated in the design to insure the integrity of the structural components of the waste facility (including liners, leachate collection systems, run-on/runoff control, capping and anything affecting the containment and/or possible release of contaminants). Unstable areas include those of (1) poor foundation conditions (possible subsidence), (2) susceptibility to mass movement, or (3) karst terrain.

6.1.3.9 In areas where valuable aquifers would be threatened by contaminant releases, unless viable alternatives have been dismissed and stringent design measures have been incorporated to minimize the possibility and magnitude of releases.

6.1.3.10 Within 200 feet of the facility property boundary unless otherwise approved by the Department.

6.1.3.11 In an area that is environmentally unique or valuable.

6.2 Design

6.2.1 General provisions. Industrial landfills shall be planned and designed by a Professional Engineer registered in Delaware. Planning and design of these facilities shall be consistent with the declared purpose and intent and in accordance with the provisions of this regulation and based on empirically derived data and state of the art technology.

6.2.2 Minimum design requirements.

All industrial landfills shall be designed to minimize contaminant releases and to prevent significant adverse impacts on human health or the environment and include at least the following:

6.2.2.1 A setback area, including a buffer zone with appropriate screening, if deemed necessary by the Department.

6.2.2.2 A liner that meets the requirements of subsection 6.3.

6.2.2.3 Leachate collection, treatment and disposal, and monitoring systems that meet the requirements of subsection 6.4.

6.2.2.4 A gas control system, if deemed necessary by the Department. This system shall meet the requirements of subsection 6.5.

6.2.2.5 A surface water management system that meets the requirements of subsection 6.6.

6.2.2.6 A groundwater monitoring system that meets the requirements of subsection 6.7.

6.2.2.7 A capping system that meets the requirements of subsection 6.8.

6.3 Liner

6.3.1 General provisions

6.3.1.1 An impermeable liner shall be provided at all industrial landfills to restrict the migration of leachate from the landfill and to prevent contamination of the underlying groundwater.

6.3.1.2 The Department reserves the right to set a more stringent liner requirement when it determines that a composite liner is not sufficient to protect human health and the environment.

6.3.1.3 The bottom of the liner (of the secondary liner, in a double liner system) shall be at least five (5) feet above the seasonal high water table, as measured in the uppermost aquifer beneath the landfill. Existing landfills or lateral expansions that have physically commenced construction before May 22, 2018 may continue to operate or construct lateral expansions under previous Department approvals.

6.3.1.4 All liners shall be prepared, constructed, and installed in accordance with a quality assurance plan included in the engineering report [subsection 4.2.1.4] and approved by the Department. For synthetic liners, the plan shall incorporate the manufacturer's recommendations.

6.3.1.5 Qualifications of the construction quality assurance staff (CQA) and the geosynthetics installer, including master seamers, on-site supervisor, and construction quality control (CQC) personnel, shall be submitted to the Department for review prior to their performing these duties on site.

6.3.1.6 All conformance and destructive samples taken as part of the construction quality assurance plan shall be tested at an independent laboratory which is accredited by the Geosynthetics Institute's

Laboratory Accreditation Program (by applicable test method) or other accreditation program acceptable to the Department.

6.3.2 Liner characteristics

6.3.2.1 Composite liner. A composite liner must have, as a minimum:

6.3.2.1.1 A primary (upper) liner which meets the following:

6.3.2.1.1.1 Is at least 45 mils thick. Geomembrane liner components consisting of high density polyethylene (HDPE) must be at least 60 mils thick for all new cells that begin physical construction after May 22, 2018.

6.3.2.1.1.2 Is constructed of materials that have appropriate chemical properties and sufficient strength and thickness to prevent failure due to pressure gradients (including static head and external hydrogeological forces), physical contact with the leachate to which it is exposed, climatic conditions, the stresses of installation, and the stresses of daily operation.

6.3.2.1.1.3 Is manufactured in accordance with formal Manufacturing Quality Control (MQC) and Manufacturing Quality Assurance (MQA) processes designed to produce geosynthetic material which meet or exceed project specifications when tested in accordance with Geosynthetic Research Institute test methods or other nationally recognized standards approved by the Department.

6.3.2.1.1.4 Is chemically resistant to the waste and leachate managed at the facility, as demonstrated by applicable ASTM standards or other nationally recognized test methods approved by the Department.

6.3.2.1.1.5 Is compounded from first quality virgin materials. No reground or reprocessed materials containing encapsulated scrim shall be used in the manufacturing of the liner.

6.3.2.1.1.6 Is free of pinholes, blisters, holes, and contaminants, which include, but are not limited to, wood, paper, metal, and nondispersed ingredients.

6.3.2.1.2 A secondary (lower) liner composed of:

6.3.2.1.2.1 Compacted clay at least two feet thick with a hydraulic conductivity no greater than 1×10^{-7} cm/sec, or

6.3.2.1.2.2 An equivalent material acceptable to the Department.

6.3.2.2 Natural liner

6.3.2.2.1 Use of natural material for liners is restricted to those areas where:

6.3.2.2.1.1 Underlying groundwater is not used and is not reasonably expected to be used for water supplies, and

6.3.2.2.1.2 The landfill subbase is subject to compaction and settlement such that a synthetic membrane would not be feasible.

6.3.2.2.2 A natural liner must meet the following requirements as a minimum:

6.3.2.2.2.1 It shall consist of compacted clay or equivalent material having a hydraulic conductivity no greater than 1×10^{-7} cm/sec.

6.3.2.2.2.2 The material shall be at least five (5) feet thick, and thicker if necessary, to prevent any leachate from migrating through the liner at any time during the active life and through the post-closure care period of the facility.

6.3.2.2.2.3 The material proposed for use shall be tested by ASTM or equivalent methods. All data shall be submitted to the Department prior to construction. Material shall be tested for the following:

6.3.2.2.2.3.1 Cation exchange capacity.

6.3.2.2.2.3.2 Classification.

6.3.2.2.2.3.3 Compaction.

6.3.2.2.2.3.4 Grain size.

6.3.2.2.2.3.5 Hydraulic conductivity.

6.3.2.2.2.3.6 Mineralogy (if required).

6.3.2.2.2.3.7 pH.

6.3.2.2.2.3.8 Pinhole test (if required).

6.3.2.2.2.3.9 Porosity.

6.3.2.2.2.3.10 Specific gravity.

6.3.2.2.2.4 Testing of the saturated hydraulic conductivity and the effect of leachate on soil hydraulic conductivity shall be performed in accordance with test methods described in the most current version of "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", EPA Publication SW-846 or other tests approved in writing by the Department.

6.3.2.2.2.5 If on-site soils are to be used as a natural liner, the uppermost five (5) feet of soil shall be excavated and recompacted to ensure homogeneity of the liner, provided, however, that with respect to dredge spoil soils, the excavation and recompaction requirement shall not apply if the applicant can demonstrate that the dredge spoil soils have acceptable characteristics as indicated above.

6.3.2.3 Double liner system. A double liner system shall meet the following requirements:

6.3.2.3.1 It shall consist of two single liners separated by a drainage layer containing a leak detection system.

6.3.2.3.2 The primary (top) liner shall be a synthetic liner which is at least 45 mils thick and which meets the requirements of subsections 6.3.2.1.1.1 through 6.3.2.1.1.6.

6.3.2.3.3 The secondary (bottom) liner may be either synthetic or natural. If synthetic, it must be at least 45 mils thick and must meet the requirements of subsections 6.3.2.1.1.1 through 6.3.2.1.1.6. If natural, it must meet the requirements of subsection 6.3.2.2.

6.3.2.3.4 The drainage layer separating the two liners shall consist of at least 12 inches of soil having a hydraulic conductivity greater than 1×10^{-2} cm/sec based on laboratory and field testing. Alternate material may be used for the drainage layer with prior written approval of the Department.

6.3.2.3.5 The leak detection system shall be capable of detecting and intercepting liquid within the drainage layer and conveying the liquid to a collection sump or monitoring point where the quantity of flow can be measured and the liquid can be sampled. The operator or designer shall calculate the Action Leakage Rate. The proposed Action Leakage Rate and a response plan if the Action Leakage Rate is exceeded shall be submitted to the Department for approval before construction of the liner is permitted. The system shall be designed to operate without clogging through the post-closure care period of the facility.

6.3.2.3.6 The upper synthetic liner membrane shall be underlain by either a geosynthetic clay or 2 feet of natural material with a permeability no greater than 10^{-7} cm/sec.

6.3.2.3.7 Alternate liner designs may be used with prior written approval of the Department.

6.3.3 Liner construction

6.3.3.1 Construction/installation of composite liner

6.3.3.1.1 At least 15 working days prior to installation of the liner, the owner or operator shall notify the Department of the installation date.

6.3.3.1.2 The liner shall be installed upon a subbase which meets the following requirements:

6.3.3.1.2.1 It shall be capable of supporting the loads and withstanding the stresses that will be imposed on it through the active life and post-closure care period of the facility and of resisting the pressure gradient above and below the liner caused by settlement, compression, or uplift.

6.3.3.1.2.2 It shall have a smooth surface that is free of all rocks, stones, roots, sharp objects, or debris of any kind.

6.3.3.1.2.3 It shall be certified in writing by the liner installer as an acceptable subbase for the liner. Written certification of acceptability shall be submitted to the Department prior to installation of the liner. However, submittal of written acceptance may proceed incrementally according to installation schedule.

6.3.3.1.3 The minimum post-loading slopes of the liner shall either be:

6.3.3.1.3.1 Two (2) percent on controlling slopes and one-half (0.5) percent on remaining slopes, OR

6.3.3.1.3.2 The controlling and remaining slopes shall be designed to prevent the head on the liner, excluding sump areas, from exceeding a depth of twelve (12) inches, including post settlement conditions.

6.3.3.1.4 The landfill shall be designed to minimize penetrations through the liner. If a penetration is essential, a liquid-tight seal must be accomplished between the penetrating structure and the synthetic membrane. Compaction of areas adjacent to the penetrating structure shall be to the same density as the surrounding soil to minimize differential settlement. Sharp edges on the penetrating structure must not come in contact with the synthetic material.

6.3.3.1.5 Bridging or stressed conditions in the liner shall be avoided with proper slack allowances for shrinkage of the liner during installation and before the placement of a protective soil layer.

6.3.3.1.6 Synthetic liners shall have factory and field seams that equal or exceed the strength requirements stipulated in the project specification. Strength requirements shall be demonstrated in accordance with applicable Geosynthetic Research Institute and ASTM test methods in accordance with the Construction Quality Assurance Plan for the project and all seams must be visually inspected and tested along their entire length for seam continuity using suitable nondestructive techniques. Other nationally recognized standards may be used with prior approval from the Department. In addition, field seams shall meet the following requirements:

6.3.3.1.6.1 Field seaming shall provide a dry sealing surface.

6.3.3.1.6.2 Seaming shall not be done when windy conditions prevail.

6.3.3.1.6.3 Seams shall be made and bonded in accordance with the supplier's recommended procedures.

6.3.3.1.7 Proper equipment shall be used in placing drainage material over the synthetic liner to avoid stress.

6.3.3.1.8 The synthetic membrane shall be protected from the waste by at least two (2) feet of drainage material incorporating the leachate collection system.

6.3.3.1.9 The synthetic membrane must be underlain by a secondary liner as described in subsection 6.3.2.1.2.

6.3.3.2 Construction of natural liner

6.3.3.2.1 All lenses, cracks, channels, root holes, or other structural nonuniformities that can increase the saturated hydraulic conductivity above 1×10^{-7} cm/sec shall be removed.

6.3.3.2.2 Natural liners shall be constructed in lifts not exceeding six (6) inches after compaction to maximize the effectiveness of the compaction throughout the lift thickness. Each lift shall be properly interfaced by scarification between lifts to ensure the bonding.

6.3.3.2.3 Clods shall be broken up and the material shall be homogenized before compaction of each lift using mixing devices such as pug mills or rotary tillers.

6.3.3.2.4 The maximum slope of the sidewalls shall not be so great as to preclude effective compaction.

6.3.3.3 Construction/installation of double liner

6.3.3.3.1 The secondary liner shall be constructed in accordance with subsection 6.3.3.2 (if it is a natural liner) or subsections 6.3.3.1.1 through 6.3.3.1.7 (if it is synthetic).

6.3.3.3.2 The primary liner shall be constructed in accordance with subsections 6.3.3.1.1 and 6.3.3.1.3 through 6.3.3.1.8.

6.4 Leachate Collection, Treatment, Disposal, And Monitoring

6.4.1 General provisions

6.4.1.1 All industrial landfills shall be designed and constructed to include a leachate collection system, a leachate treatment and disposal system, and a leachate monitoring system. Existing landfills or lateral expansions that have physically commenced construction before May 22, 2018 may continue to operate or construct lateral expansions under previous Department approvals.

6.4.1.2 The leachate systems shall be constructed, installed, and maintained in accordance with the Department approved quality assurance plan.

6.4.1.3 The owner or operator shall keep and maintain documentation for the quality assurance procedures through the post-closure care period of the facility.

6.4.2 Leachate collection

6.4.2.1 Minimum design specifications

6.4.2.1.1 The leachate collection system shall be designed to operate without clogging through the post-closure care period of the facility.

6.4.2.1.2 All elements of the system (pipes, sumps, pumps, etc.) shall be sized according to water balance calculations and shall be capable of handling peak flows.

6.4.2.1.3 Collection pipes shall be sized and spaced to efficiently remove leachate from the bottom of the waste and the side walls of the cell. The capacity of the mains shall be at least equal to the sum of the capacities of the laterals.

6.4.2.1.4 The pipes shall be designed to withstand the weight, stresses, and disturbances from the overlying wastes, waste cover materials, equipment operation, and vehicular traffic.

6.4.2.1.5 The collection pipes shall be designed to drain by gravity to a sump system. Sumps must function automatically and shall contain a conveyance system for the removal of leachate.

6.4.2.1.6 Manholes or cleanout risers shall be located along the perimeter of the leachate collection system. The number and spacing of the manholes shall be sufficient to insure proper maintenance of the system by water jet flushing or an equivalent method.

6.4.2.1.7 Innovative leachate collection systems incorporating alternative designs may be used, after approval by the Department, if they are shown to be equivalent to or more effective than the specified design.

6.4.2.1.8 The leachate collection system must be designed and operated to prevent the leachate head on the liner from exceeding a depth of 12 inches.

6.4.2.2 Construction standards

6.4.2.2.1 The leachate collection system shall be installed immediately above an impermeable liner and at the bottom of a drainage layer. The drainage layer shall be at least 12 inches thick with a hydraulic conductivity not less than $1x10^{-2}$ cm/sec and a minimum post-loading controlling slope of two (2) percent. Alternate materials may be used for the drainage layer, with prior written approval of the Department.

6.4.2.2.2 The following tests shall be performed on the soil proposed for use in the drainage layer, and all data shall be submitted to the Department prior to construction of the drainage layer. These tests shall be performed in accordance with current ASTM, AASHTO, or equivalent methods.

6.4.2.2.2.1 Classification

6.4.2.2.2.2 Porosity

6.4.2.2.2.3 Relative density or compaction

6.4.2.2.2.4 Specific gravity

6.4.2.2.2.5 Hydraulic conductivity

6.4.2.2.3 The leachate collection system and manholes or cleanout risers shall be constructed of materials that can withstand the chemical attack that results from leachates.

6.4.2.3 Operational procedures

6.4.2.3.1 The leachate collection system shall operate automatically whenever leachate is present in the sump to remove accumulated leachate.

6.4.2.3.2 Inspections shall be conducted weekly to verify proper functioning of the leachate collection system and to detect the presence of leachate in the removal sump. The owner or operator shall keep records on the system to provide sufficient information that the leachate collection system is functional and operating properly. The amount of leachate collected from each cell shall be recorded on a weekly basis.

6.4.2.3.3 Collection lines shall be cleaned according to a Department approved scheduled maintenance program and more frequently if required.

6.4.2.3.4 Owners or operators of industrial landfills shall inspect for leachate seeps at least once each operating day and shall maintain records of the results of these inspections and of any response actions necessary to prevent leachate from contaminating surface water.

6.4.3 Leachate treatment and disposal. The permittee must maintain all necessary permits and approvals for leachate storage and discharge activities.

6.4.3.1 The leachate treatment and disposal system shall be designed in accordance with one of the following options:

6.4.3.1.1 Complete treatment on-site with or without direct discharge to surface water;

6.4.3.1.2 Pretreatment on-site with discharge to an off-site treatment works for final treatment;

6.4.3.1.3 Storage on-site with discharge to an off-site treatment works for complete treatment;

6.4.3.1.4 Direct discharge to an off-site treatment works; or

6.4.3.1.5 Pretreatment on site with discharge on site.

6.4.3.2 Leachate storage prior to treatment shall be within tanks constructed and installed in accordance with the following standards:

6.4.3.2.1 The tank shall be placed above ground.

6.4.3.2.2 The storage tank shall be designed in accordance with American Petroleum Institute (API), Underwriters Laboratory (UL), or an equivalent standard appropriate to the material being used, and shall be constructed of or lined with material which has a demonstrated chemical resistance to the leachate.

6.4.3.2.3 The storage tank area shall have a liner capable of preventing any leachate which may escape from the tank from coming into contact with the underlying soil.

6.4.3.2.4 Secondary containment shall be required for all leachate storage tanks and the outer containment wall shall be compatible with, and capable of containing, the leachate stored. If not roofed or otherwise protected from the accumulation of precipitation, the secondary containment area shall have a capacity at least ten percent greater than the capacity of the tank, and shall be equipped with a manually-controlled pump, or gravity drain, to remove precipitation. A double-walled leachate storage tank may be used to fulfill the requirements for secondary containment if the tank is installed with over-fill prevention and leak detection devices that are continuously monitored.

6.4.3.2.5 All storage tanks shall be equipped with a venting system.

6.4.3.2.6 All storage tanks shall be equipped with a high liquid level alarm or warning device. The alarm system shall be wired to the location where assistance will be available to respond to the emergency.

6.4.3.3 On-site complete treatment or pretreatment facilities shall be designed and constructed in accordance with the following:

6.4.3.3.1 On-site treatment units shall be designed based on the results of a treatability study, the results of the operations of a pilot plant, or written information documenting the performance of an equivalent leachate treatment system.

6.4.3.3.2 On-site treatment units shall be designed and constructed by staging of the units to allow for online modification of the treatment system to account for variability of the leachate quality and quantity.

6.4.3.4 For all leachate discharges planned for publicly owned treatment works (POTW), the owner or operator of the landfill shall notify the receiving POTW of intent to discharge leachate into the collection system and shall provide the POTW with analysis of the leachate as required by the POTW.

6.4.3.5 All leachate treatment and disposal systems shall be designed and constructed to control odors.

6.4.3.6 Residuals from the on-site treatment and disposal systems shall be sampled and analyzed for hazardous waste characteristics in accordance with Delaware's Regulations Governing Hazardous Waste.

6.4.3.7 Recirculation of leachate may be allowed, subject to approval by the Department, to accelerate decomposition of the waste. At new facilities and expansions of existing facilities, recirculation will be allowed only in areas constructed with a composite liner system or a double liner system. The method of recirculation must be approved by the Department in advance and annually so long as the recirculation continues. Records of leachate collected and recirculated must be kept and reported and any resultant problems reported to the Department and remedied as soon as practicable and included in the annual report.

6.4.4 Leachate monitoring

6.4.4.1 The leachate monitoring system shall be capable of measuring the quantity of the flow and sampling the leachate from each landfill cell. The volume of leachate collected from each cell shall be determined at least monthly and reported quarterly.

6.4.4.2 Leachate monitoring of the influent and effluent of the treatment and disposal system shall be performed according to a Department approved plan which includes quality control and quality assurance procedures.

6.4.4.3 Samples of leachate effluent and influent shall be analyzed as specified by the Department. The parameters to be analyzed will depend on the characteristics of the waste.

6.4.4.4 Leachate monitoring results shall be submitted to the Department as required.

6.4.4.5 For a double liner system, if the Action Leakage Rate of the leak detection system is exceeded, the owner or operator of the landfill shall notify the Department within five (5) working days. The owner or operator shall also sample and analyze the liquid in the leak detection system for parameters required by the Department.

6.4.4.6 Test methods used to determine the parameters of subsection 6.4.4.3 shall be those described in the most current version of "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," EPA Publication SW-846, or other tests approved in writing by the Department.

6.5 Gas Control

6.5.1 General provisions

6.5.1.1 Gas control systems shall be installed at industrial landfills where the materials landfilled would be expected to produce gas through biological activity or reaction.

6.5.1.2 The gas control system shall be designed and constructed to:

6.5.1.2.1 Evacuate gas from within the waste to prevent the accumulation of gas on-site or off-site;

6.5.1.2.2 Prevent and control damage to vegetation; and

6.5.1.2.3 Prevent odors from the facility being detectable at the facility property line in sufficient quantities to cause or create a condition of air pollution.

6.5.1.3 The concentration of landfill gas in facility structures (except gas recovery system components) shall not exceed 25% of the lower explosive limit (LEL). The concentration of landfill gas at the facility boundary shall not exceed the LEL.

6.5.2 Design and construction standards

6.5.2.1 The owner or operator of an industrial landfill shall consider both active and passive gas control systems and shall provide an evaluation of the proposed system for Department approval.

6.5.2.2 The owner or operator shall perform an analysis to establish the required spacing of gas control vents to provide an effective system.

6.5.2.3 The gas control system shall be designed to evacuate gas from all levels within the waste.

6.5.2.4 The system shall not interfere with or cause failure of the liner or leachate systems.

6.5.3 Monitoring

6.5.3.1 A sufficient number of gas monitoring wells shall be installed to evaluate gas production rates in the landfill.

6.5.3.2 The owner or operator shall sample the gas monitoring wells and provide analytical results as required by conditions specified in the facility permit.

6.5.3.3 At landfills utilizing natural liners, gas monitoring probes must be installed in the soil outside the lined area to evaluate any lateral migration of landfill gas.

6.5.3.4 Emissions from active and passive gas control systems may require a permit from the Division of Air Quality.

6.6 Surface Water Management

6.6.1 General provisions. An owner or operator of an industrial landfill shall design, construct, and maintain a surface water management system to:

6.6.1.1 Prevent erosion of the waste and cover;

6.6.1.2 Prevent the collection of standing water; and

6.6.1.3 Minimize surface water runoff onto and into the waste.

6.6.2 Design requirements. An owner or operator of an industrial landfill shall include:

6.6.2.1 A run-on control system to prevent flow onto the active portion of the landfill during the peak discharge from a 24-hour, 25-year storm.

6.6.2.2 The surface water management system shall be designed to control, at a minimum, the runoff from the discharge of a 24-hr, 25-year storm. The system shall be designed to include:

6.6.2.2.1 Detention basins to provide temporary storage of the expected runoff from the design storm with sufficient reserve capacity to contain accumulated precipitation and sediment prior to discharge.

6.6.2.2.2 Diversion structures designed to prevent runoff generated within the active cells from moving off site of the lined areas.

6.6.3 Surface water monitoring. The surface water monitoring frequency and parameters to be analyzed shall depend upon the characteristics of the waste and shall be specified by the Department. The Department reserves the right to substitute surface water monitoring required under regulations other than DRGSW for this requirement.

6.6.4 Channeling of runoff

6.6.4.1 Runoff from the active cell(s) must be channeled to the leachate treatment and disposal system.

6.6.4.2 Runoff from the unused portion of the active cell(s) that has not been in contact with waste can be channeled to the detention basins or other approved sedimentation control device with prior written approval from the Department.

6.6.4.3 Runoff from closed cells will be directed to the detention basins or other approved sedimentation control systems.

6.6.5 Discharge. The construction of and discharge from detention basins and other surface water management systems shall be in compliance with all applicable federal and state regulations.

6.6.6 Stormwater Plan. Owners or operators of all industrial landfills shall develop and maintain a Stormwater Plan (SWP) (also known as a Stormwater Pollution and Prevention Plan (SWPPP)) for areas associated with the landfill facility. The SWP/SWPPP shall describe stormwater management controls and practices in-place or planned for the facility and shall identify potential sources of pollutants which may reasonably be expected to affect the quality of stormwater discharges from landfill operations and site maintenance. The SWP/SWPP need not address construction activities regulated by a Sediment and Stormwater Plan Approval issued by the Department. An initial plan shall be submitted to the Department no later than October 28, 2018. SWP/SWPPP plans created under regulations other than DRGSW can be substituted for this requirement provided the plan includes the following:

6.6.6.1 Facility identification, including the name, business address, and contact information for the person responsible for development, implementation, maintenance, and revision of the SWP/ SWPPP.

6.6.6.2 Facility assessment, including a facility description and narrative describing all activities and potential sources of pollutants that may reasonably be expected to add pollutants to stormwater discharges. Examples include the following activities and potential sources when they are exposed to stormwater: Loading and unloading areas, outdoor storage or processing areas, vehicle/equipment maintenance areas, fueling areas, and liquid storage tanks (including secondary containment areas). The facility assessment shall also identify discharge points from these activities and potential sources of pollutants.

6.6.6.3 Facility map. All markings and delineations on the map shall be clearly identifiable. The map shall identify all areas where solid wastes are stored or disposed, all buildings, areas where industrial materials are stored, the drainage areas associated with each stormwater discharge from the facility, all stormwater related drainage and discharge structures including all conveyances and appurtenances, any structural stormwater controls (i.e. basins, secondary containments, and stormwater diversions), all surface waters that receive stormwater discharges from the facility, and directions of stormwater flow. The map shall also include locations of the following activities if such activities are exposed to precipitation: fueling stations, vehicle and equipment maintenance or cleaning areas, liquid storage tanks and areas where leachate can be transferred into vehicles for off-site disposal. If contaminated runoff from adjacent facilities is suspected, that should also be included on the map.

6.6.6.4 Stormwater management at the facility. The SWP/SWPPP shall describe stormwater management controls and practices appropriate to control potential pollutants identified in the facility assessment. The SWP/SWPPP must describe the location and use of structural controls (both existing and planned), as well as non-structural controls such as best management practices, industrial material management, spill prevention/response, erosion control, and periodic inspections.

6.6.7 Maintenance on surface water management systems shall be done in accordance with any post-construction requirement from the Division of Watershed Stewardship and conditions specified within the Solid Waste Permit.

6.6.8 An initial periodic report for all completed surface water management systems shall be prepared and signed by a Professional Engineer registered in Delaware no later than May 1, 2019. Subsequent periodic reports shall be submitted every five (5) years. Modifications to a surface water management system or part of a surface water management system may require approval from other state or federal agencies. The report shall at a minimum include:

6.6.8.1 A description of currently installed surface water management systems;

6.6.8.2 Maps depicting the locations of surface water management systems and surface water flow through the facility to the point of discharge; and

6.6.8.3 Recommendations for continued operations and maintenance.

6.7 Groundwater Monitoring And Corrective Action

6.7.1 General provision. Owners or operators of all industrial landfill facilities shall maintain and operate a groundwater monitoring program to evaluate facility impact upon groundwater quality.

6.7.2 Design and construction of monitoring system

6.7.2.1 The groundwater monitoring system shall be designed by, constructed under the direction of, and attested to by, a Professional Geologist registered in Delaware.

6.7.2.2 The system shall consist of a sufficient number of wells, installed at appropriate locations and depths, to define the groundwater flow system and shall be developed in accordance with Departmental requirements to yield groundwater samples that are representative of the aquifer water quality, both unaffected by (background), and potentially impacted by, downgradient contaminant leakage from the facility.

6.7.2.3 The number, spacing, location, depth, and screened interval of the monitoring wells shall be approved by the Department prior to installation.

6.7.2.4 All monitoring wells shall be constructed in accordance with the Regulations Governing the Construction and Use of Wells and any subsequently approved guidelines. Variation from the existing guidelines must be approved by the Department in writing prior to construction.

6.7.3 Groundwater sampling

6.7.3.1 The permittee shall submit a groundwater sampling plan to the Department at the time of permit application. The sampling plan submitted at the time of the application, and all revisions to the sampling plan, must be certified by a Professional Engineer or Professional Geologist registered in Delaware, that the modifications do not cause increased risks to human health or the environment. The Department reserves the right to allow a variance to this requirement for modifications deemed minor. The sampling plan must include procedures and techniques for:

6.7.3.1.1 Sample collection, preservation, and transport:

6.7.3.1.1.1 Samples will be collected at low flow rates (<1 l/min) to minimize turbidity of the samples.

6.7.3.1.1.2 Samples will be field filtered only when turbidity exceeds 10 NTU. Repeated sampling of any well where turbidity exceeds 10 NTU is not permitted without Department approval. Approval will only be granted in cases where turbidity cannot be controlled by careful well construction, development, and sampling.

6.7.3.1.2 Analytical procedures and quality assurance; and

6.7.3.1.3 Chain of custody control.

6.7.3.2 Sample constituents

6.7.3.2.1 The parameters to be analyzed shall depend upon the characteristics of the waste and shall be specified by the Department.

6.7.3.2.2 Test methods used to determine the parameters of subsection 6.7.3.2.1 shall be those described in the most current version of "Test Methods for Evaluating Solid Waste, Physical/ Chemical Methods", EPA Publication Number SW-846 or other tests approved in writing by the Department.

6.7.3.2.3 Water levels will be measured prior to sample collection.

6.7.3.3 The Department may observe, and may request advance notice of, the groundwater sampling conducted by the permittee or his/her designee and may request split samples for analysis.

6.7.3.4 If the Department determines that the groundwater monitoring data indicate that groundwater contamination has occurred, a remedial action program may be required.

6.7.4 Data evaluation

6.7.4.1 The owner or operator must establish the background quality for each sampling parameter or constituent. The background quality is that which would be expected with no impact by contaminant releases from the waste cells.

6.7.4.2 Methods for Data Evaluation

6.7.4.2.1 The owner or operator must specify in the operating record the methods to be used for statistical evaluation of the monitoring data. These may include:

6.7.4.2.1.1 A parametric analysis of variance followed by multiple comparison procedures to identify statistically significant evidence of contamination. The method must include estimation and testing of the contrasts between each compliance well's mean and the background mean levels for each constituent.

6.7.4.2.1.2 An analysis of variance based on ranks followed by multiple comparison procedures to identify statistically significant evidence of contamination. The method must include estimation and testing of the contrasts between each compliance well's median and the background median levels for each constituent.

6.7.4.2.1.3 A tolerance or prediction interval procedure in which a range for each constituent is established from the distribution of the background data and the level of each constituent in each compliance (downgradient) monitor well is compared to the upper tolerance or prediction limit,

6.7.4.2.1.4 A control chart approach that plots concentrations of each constituent versus the background range, or

6.7.4.2.1.5 Any other statistical method chosen to meet the following requirements and approved by the Department:

6.7.4.2.1.5.1 Appropriate in distribution and number of available data to meet the requirements of the statistical test chosen;

6.7.4.2.1.5.2 Capable of limiting individual constituent comparisons to Type I error levels less than 0.01 or multiple constituent comparisons to Type I error levels less than 0.05, for each testing period. (This requirement does not apply to tolerance intervals, prediction intervals, or control charts.)

6.7.4.2.2 Alternate methods may be used with prior written approval from the Department.

6.7.4.3 If necessary, the statistical analysis method shall include procedures to control or correct for seasonal and spatial variability, as well as temporal correlation in the data.

6.7.4.4 The owner or operator must determine whether or not there is a statistically significant increase over background values for each parameter or constituent required in the monitoring program by comparisons using the chosen method of evaluation. This evaluation must be performed within a reasonable period of sampling and analysis normally within 30 days of obtaining sampling results.

6.7.4.5 If any statistically significant increase occurs, the permittee must:

6.7.4.5.1 Notify the Department and place the result in the operating record within 14 days, and

6.7.4.5.2 Assess the probable accuracy and possible risk associated with the finding in the annual report.

6.7.4.6 Performance standards will be established at each site which are intended to provide adequate protection for human health and the environment. The performance standards may be proposed by the permittee, but must be approved by the Department, and shall be incorporated in the facility permit. In general, performance standards will be the maximum contaminant levels (MCLs) for public drinking water. However, the Department may specify performance levels which are more stringent to protect adjacent surface water (and prevent violation of surface water quality standards) or less stringent (where groundwater at the site will not threaten existing or reasonably expected sources of drinking water or cause violation of surface water quality standards) as appropriate.

6.7.4.7 If any release of contaminants from the landfill to the groundwater is detected, either by exceedance of background concentrations or violation of a performance standard in the downgradient wells (points of compliance), the owner or operator must:

6.7.4.7.1 Notify the Department and place the result in the operating record within 14 days,

6.7.4.7.2 Resample to confirm the result and/or demonstrate that the result was an error or that the increase was due to a source other than the permitted waste facility within 90 days,

6.7.4.7.3 Notify the Department of the result of confirmation within 14 days of availability of the result, and

6.7.4.7.4 If a release is confirmed, perform an assessment of corrective measure as described in subsection 6.7.6.

6.7.5 Reporting

6.7.5.1 All groundwater, leachate, and gas monitoring shall be conducted on a schedule to be determined by the Department and the results submitted within 60 days of sampling. Reports of any statistically significant increases in downgradient wells or violation of performance standards in wells or streams must be reported to the Department within 14 days as noted above.

6.7.5.2 An annual hydrogeologic monitoring report will be prepared and signed by a Professional Geologist registered in Delaware, and shall include:

6.7.5.2.1 Tabulation of all leachate flow and quality and groundwater quality data from current and preceding years;

6.7.5.2.2 Graphical presentation of leachate flow and quality and groundwater quality data from current and preceding years as required in the operating permit;

6.7.5.2.3 Maps showing groundwater flow patterns at each time of groundwater sampling and groundwater monitoring well locations;

6.7.5.2.4 A discussion of the groundwater monitoring results;

6.7.5.2.5 Identification of any statistically significant increases in wells and/or exceedances of performance standards;

6.7.5.2.6 Confirmation results and conclusions related to the accuracy of these results and/or reasonable explanation for the results;

6.7.5.2.7 An evaluation of the significance of the results including whether they indicate a contaminant release has occurred and any recommendations for corrective measures, if appropriate;

6.7.5.2.8 Groundwater monitoring well activities (e.g., well maintenance, well decommissioning, etc.);

6.7.5.2.9 Recommendations for any changes in the monitoring program including changes in the number or location of sampling points, sampling frequency, and parameters or procedures; and

6.7.5.2.10 Any additional hydrogeologic reporting requirements specified in the Solid Waste Permit.

6.7.5.3 In addition to paper copies of reports, the Department may require all, or part of, any required report to be submitted on machine-readable media in a format mutually acceptable to the Department and the permittee. With the approval of the Department, reports submitted on machine-readable media may be substituted for paper reports.

6.7.6 Assessment of Corrective Measures

6.7.6.1 An assessment (reassessment) of corrective measures by the owner or operator is required (within 90 days) of confirmation of a contaminant release or an exceedance of a performance standard. The owner or operator must perform this assessment which must include:

6.7.6.1.1 Identification of the nature and extent of the release (which may require construction and sampling of additional wells, analysis for additional constituents including those required for leachate, geophysical surveys, and/or other measures);

6.7.6.1.2 Reassessment of contaminant fate and potential contaminant receptors (wells and/or receiving streams);

6.7.6.1.3 Evaluation of feasible corrective measures to:

6.7.6.1.3.1 Prevent exposure to potentially harmful levels of contaminants (exceeding performance standards);

6.7.6.1.3.2 Reduce, minimize, or prevent further contaminant releases; and

6.7.6.1.3.3 Reduce, minimize, or prevent the off-site migration of contaminants.

6.7.6.1.4 The implementability (and time to implement) and costs of the feasible alternatives; and

6.7.6.1.5 Recommendations for remedial action.

6.7.6.2 The owner or operator must present the results of the corrective measures assessment, including a proposed remedy, (with a schedule for initiation and completion) for public comment at a public meeting.

6.7.7 Selection of Remedy

6.7.7.1 Based on the results of the corrective measures assessment and public meeting, the owner/ operator will select a remedial action.

6.7.7.2 Remedies must:

6.7.7.2.1 Be protective of human health and the environment;

6.7.7.2.2 Control source(s) of contaminant releases so as to reduce or eliminate (to the maximum extent practicable) further releases of contaminants that pose a threat to human health or the environment;

6.7.7.2.3 Comply with the site performance standards at the points of compliance (to the extent feasible);

6.7.7.2.4 Remove from the environment as much of the contaminated material that was released from the facility as is feasible, taking into account factors such as avoiding inappropriate disturbance of sensitive ecosystems; and

6.7.7.2.5 Comply with standards for the management of wastes.

6.7.7.3 The Department may determine that remediation of a contaminant release is not necessary if the permittee can demonstrate to the satisfaction of the Department (or the Department certifies that it is satisfied) that the groundwater is not currently or reasonably expected to be a source of drinking water, will not migrate so as to threaten a source of drinking water, or will not cause violation of surface water quality standards (i.e. does not represent a significant threat to human health or the environment).

6.7.8 Implementation of Corrective Action

6.7.8.1 Within 90 days of selecting a remedy under subsection 6.7.7, the owner or operator must initiate remedial activities. Based on the schedule established under subsection 6.7.6.2 for initiation and remediation of remedial activities, the owner or operator must:

6.7.8.1.1 Implement the corrective action remedy;

6.7.8.1.2 Take any interim measures necessary to ensure protection of human health and the environment (such as replacement of contaminated or imminently threatened water supplies); and

6.7.8.1.3 Perform groundwater and/or surface water monitoring to demonstrate the effectiveness of the remedy including whether or not compliance is achieved with the performance standards.

6.7.8.2 If the owner or operator determines, based on information obtained after implementation of the remedy has begun or other information, that compliance with remediation objectives (including achievement of performance standards) cannot be practically achieved with the remedy selected, the owner or operator must notify the Department and request authorization to proceed with another feasible method consistent with the overall objective of the remedy.

6.7.8.3 If the permittee determines that compliance with remedial action objectives (subsection 6.7.8) cannot be practically achieved, the permittee must notify the Department and implement alternate methods to control exposure of humans or the environment to residual contamination and implement alternative control measures.

6.7.8.4 Remedies selected shall be considered complete when:

6.7.8.4.1 All actions required to implement the remedy have been achieved; and

6.7.8.4.2 The groundwater protection standards or alternate requirements agreed upon have been achieved for a period of three years or alternate period approved by the Department.

6.7.8.5 Upon completion of the remedy, the owner or operator must notify the Department that a certification of the remedy has been completed in compliance with the requirement and placed in the operating records. This certification must be signed by a Professional Geologist registered in Delaware.

6.7.8.6 Upon completion of the remedy, the owner or operator will continue groundwater monitoring as required by provisions of subsection 6.7.3 and approved by the Department.

6.8 Capping System

6.8.1 Requirement for a capping system

6.8.1.1 Upon closure of the landfill or landfill cell, the permittee shall install a capping system that will control the emission of gas (if applicable), promote the establishment of vegetative cover, and minimize infiltration and percolation of water into, and prevent erosion of, the waste throughout the post-closure care period.

6.8.1.2 The capping system shall be in place 180 days following final waste disposal activity unless the Department approves a longer period of time.

6.8.1.3 The capping system shall extend beyond the edge of the lined area.

6.8.1.4 The proposed design of the capping system must be approved by the Department prior to installation.

6.8.2 Composition of the capping system. The capping system shall consist of at least the following components:

6.8.2.1 A final grading layer on the waste, consisting of at least six (6) inches of soil or equivalent material, to attain the final slope and provide a stable base for subsequent system components. Daily and intermediate cover may be used for this purpose. Alternative materials may be used for the grading layer with prior written approval by the Department.

6.8.2.2 An impermeable layer, consisting of at least:

6.8.2.2.1 A 30 mil geomembrane underlain by a geotextile, or

6.8.2.2.2 24 inches of clay at a hydraulic conductivity of less than 1×10^{-7} cm/sec or depth of equivalent material having a hydraulic conductivity less than 1×10^{-7} cm/sec, such depth to be determined based on the hydraulic conductivity of 24 inches of clay at a hydraulic conductivity of 1×10^{-7} cm/sec.

6.8.2.2.3 Alternative materials may be used for the impermeable layer with prior written approval of the Department.

6.8.2.3 Final cover. The permittee shall propose a suitable vegetation dependent upon the quality and characteristics of the topsoil and compatible with the intended final use of the facility. Maintenance schedules and application rates for fertilizer and mulch shall also be submitted for approval. A final cover to provide plant rooting and prevent erosion consisting of:

6.8.2.3.1 Eighteen (18) inches of soil to provide rooting depth and moisture for plant growth, and

6.8.2.3.2 Six (6) inches of topsoil or other material approved by the Department to support the proposed vegetation; or

6.8.2.3.3 A suitable layer of alternative material or combination thereof to assure adequate rooting and moisture retention to support the proposed vegetation.

6.8.2.3.4 Alternate materials may be used for the final cover with prior written approval of the Department.

6.8.3 Final slopes

6.8.3.1 The grades of the final slope shall be constructed in accordance with the following minimum standards:

6.8.3.1.1 The final grade of the top slope, after allowing for settlement and subsidence, shall be designed to promote runoff; and

6.8.3.1.2 The final grades of the side slopes shall be, at a maximum, three horizontal to one vertical (3:1).

6.8.3.2 The top and side slopes shall be maintained to prevent erosion of the capping system and to insure complete vegetation cover.

6.9 Landfill Operation And Maintenance Standards

6.9.1 General provisions

6.9.1.1 Landfills and landfill cells closed in accordance with DRGSW shall conduct maintenance, recordkeeping, and reporting activities in accordance with subsections 6.10 through 6.12 and the Solid Waste Permit.

6.9.1.2 Industrial landfills shall be operated so as to create an aesthetically desirable environment and to preclude degradation of land, air, surface water, or groundwater.

6.9.1.3 Industrial landfills shall be maintained and operated to conform with the approved Plan of Operation.

6.9.2 Details of operation and maintenance

6.9.2.1 Spreading and compacting. The working face shall be confined to the smallest practical area, as is consistent with the proper operation of trucks and equipment. The waste shall be spread in layers and compacted by repeated passes of the compacting equipment to obtain the degree of compaction specified in the Solid Waste Permit.

6.9.2.2 Cover. Approved cover material shall be applied at a frequency and thickness specified by the Department.

6.9.2.3 Control of nuisances and hazards.

6.9.2.3.1 Odor: The operation of the landfill shall not result in odors associated with solid waste being detected off site.

6.9.2.3.2 Litter: The scattering of refuse and wind-blown litter shall be controlled by the use of portable fences, natural barriers, or other suitable methods. No refuse or litter shall be allowed to migrate off site.

6.9.2.3.3 Dust, fires: The landfill shall be operated in a manner which eliminates, to the extent possible, dust problems and fires. Industrial Landfills must develop and implement a dust control plan in accordance with the Solid Waste Permit.

6.9.2.4 Access. Access to the site shall be limited to those persons authorized to use the site for the disposal of solid waste and to those hours when an attendant is on duty. This section shall not be construed to limit right of entry pursuant to 7 **Del.C.** 6024. Access to the site by unauthorized persons shall be prevented by the use of barriers, fences and gates, or other suitable means.

6.9.2.5 Salvaging. Salvaging operations shall be so organized that they will not interfere with the proper disposal of any solid waste. No salvage operation shall be allowed which creates unsightliness, nuisances, health hazards, or potential safety hazards.

6.9.2.6 Personnel. Sufficient numbers and types of personnel shall be available at the site to insure capability for operation in accordance with these regulations.

6.9.2.7 Equipment. Adequate numbers and types of equipment commensurate with the size of the operation shall be available at the site to ensure operation of the landfill in accordance with the provisions of these regulations and the plan of operation. Waste handling equipment shall be cleaned routinely and maintained in accordance with the manufacturer's recommendations.

6.9.2.8 Employee health and safety. Employees at the site shall work under all appropriate health and safety guidelines established by the Occupational Safety and Health Administration. The owner or operator of the landfill shall provide suitable shelter, sanitary facilities, and safe drinking water for personnel at the site. A reliable telephone or radio communication system shall be provided for site personnel. First aid equipment shall be available at the site.

6.9.2.9 Weekly Inspections. No later than May 31, 2018, weekly inspections shall be conducted by a Qualified Person at intervals not to exceed seven (7) days. At a minimum, inspections shall include observations for any appearance of actual or potential structural weakness and other conditions that can disrupt the operation or safety of the industrial waste landfill. Results of the weekly inspections shall be maintained per subsection 6.9.3. If the operator cannot comply with conducting an inspection within a particular week, the Department shall be notified as to the reason for missing the weekly inspection BEFORE the end of that week. Additionally, the missed weekly inspection shall, nonetheless, be conducted at the earliest possible time the following week. This "post" weekly inspection will not count as that week's inspection.

6.9.2.10 Annual Inspection. An annual landfill inspection shall be conducted by a Professional Engineer registered in Delaware to evaluate whether the landfill design, construction, operation, and maintenance is consistent with recognized and generally accepted good engineering standards. Reports are to be submitted annually as part of the reporting requirements of subsection 6.9.4.

6.9.2.10.1 Inspections. At a minimum, the inspection must include a review of available information regarding the status and condition of the landfill (e.g., inspections within the operating record) and a visual inspection of the landfill to identify signs of distress or malfunction of the landfill.

6.9.2.10.2 Inspection Report. At a minimum, the inspection report must document any changes in geometry of the structure since the previous inspection, any appearances of an actual or

potential structural weakness of the landfill, any conditions that are disrupting or have the potential to disrupt the operations and safety of the landfill, and any other changes which may have affected the stability or operation of the landfill since the last inspection.

6.9.2.10.3 Deficiencies and Releases. If a deficiency or release is identified during the inspection, the owner or operator must remedy the deficiency or release as soon as feasible and prepare documentation detailing the corrective measure. Deficiencies or release must also be reported in accordance with the Solid Waste Permit, as applicable.

6.9.3 Recordkeeping. Records must be made available for inspection, with reasonable notice, by representatives of the Department. The following information must be recorded, as it becomes available, and retained by the owner or operator ~~of~~ at their facility in a format acceptable to the Department and Permittee, for any new or existing industrial landfill until the end of the post-closure care period of the landfill.

6.9.3.1 Records demonstrating that liners, leachate control systems, gas control systems, capping system, surface water management systems, and all monitoring systems are constructed or installed in accordance with the design criteria required in subsections 6.3 through 6.8.

6.9.3.2 Monitoring, testing, or analytical data where required by subsections 6.4 through 6.8.

6.9.3.3 Volume and/or weight of wastes received.

6.9.3.4 Any report required to be submitted by the Solid Waste Permit.

6.9.3.5 Any additional records specified by the Department.

6.9.4 Reporting. The permittee shall submit to the Department on an annual basis a report summarizing facility operations for the preceding calendar year. The report shall describe and summarize all solid waste disposal, environmental monitoring, and construction activities conducted within the year covered by the report. The report shall be prepared under the direction of and signed by the Facility Manager. In addition to paper copies of reports, the Department may require documents to be submitted on machine-readable media in a format mutually acceptable to the Department and the permittee. With approval of the Department, reports submitted on machine-readable media may be submitted in lieu of paper reports. The report shall include, but not necessarily be limited to, the following:

6.9.4.1 The volume or tonnage of solid waste landfilled at the facility;

6.9.4.2 The estimated total volume of solid waste currently landfilled at the facility;

6.9.4.3 The estimated remaining capacity of the facility, in both tonnage and years;

6.9.4.4 Leachate quantity and quality data as required in subsection 6.4.4, and in the Solid Waste Permit;

6.9.4.5 Gas monitoring data as required in subsection 6.5.3, and in the Solid Waste Permit;

6.9.4.6 An updated estimate of the cost of closure and post-closure care for the facility, as required in subsection 6.10.3.5;

6.9.4.7 Any intentional or accidental deviations from the approved Plan of Operation, and any unusual situations encountered during the year;

6.9.4.8 All construction or corrective work conducted on the site in accordance with approved plans or to achieve compliance with these regulations; and

6.9.4.9 The permittee must also submit any additional reports specified in the Solid Waste Permit.

6.9.5 Prohibitions

6.9.5.1 The owner or operator of an industrial landfill shall not knowingly accept for disposal any hazardous waste.

6.9.5.2 Open burning of any solid waste is prohibited within the active portion of the landfill.

6.9.5.3 Scavenging is prohibited on any landfill site.

6.9.5.4 No wastes other than those specified in the permit may be disposed of at the facility.

6.10 Closure

6.10.1 General provisions. The owner or operator of an industrial landfill must close the completed landfill or landfill cell in a manner that:

6.10.1.1 Minimizes the need for further maintenance, and

6.10.1.2 Minimizes the post-closure escape of solid waste constituents, leachate, and landfill gases to the surface water, groundwater, or atmosphere.

6.10.2 Required submittals; notification

6.10.2.1 An owner or operator of a new industrial landfill must submit a conceptual closure plan for the facility at the time of initial (i.e., construction) permit application.

6.10.2.2 At least 180 days prior to the projected date when wastes will no longer be accepted at the landfill or cell, the landfill owner or operator shall submit to the Department written notification of intent to close the facility or cell, a closure plan, and a closure schedule.

6.10.2.3 If the Department determines that the closure plan and closure schedule are sufficient to ensure closure in accordance with the performance standards described in subsection 6.10.1, it will modify the Solid Waste Permit to allow closure to take place.

6.10.2.4 The owner or operator shall not commence closure activities before receiving the necessary modifications to the Solid Waste Permit.

6.10.2.5 A copy of the closure plan must be maintained at the facility or at some other location designated by the owner or operator through the post-closure care period of the facility.

6.10.3 Closure plan contents. The closure plan must be certified by a Professional Engineer registered in Delaware. The closure plan for an industrial landfill or cell must include, at a minimum, the following:

6.10.3.1 A description of the methods, procedures, and processes that will be used to close a landfill and each individual cell thereof in accordance with the closure performance standard in subsection 6.10.1.

6.10.3.2 A description of the capping system required under subsection 6.8. This shall include a description of the system design, the type of cover to be used, and a discussion of how the capping system will achieve the objectives of subsection 6.10.1.

6.10.3.3 A description of other activities necessary to satisfy the closure performance standard, including, but not limited to, the removal or disposal of all non-landfilled wastes located on site (e.g., wastes from landfill runoff collection ponds).

6.10.3.4 An estimate of the maximum inventory of waste on-site over the active life of the landfill.

6.10.3.5 An estimate of the cost of closing the facility or cell and of the cost of post-closure monitoring and maintenance throughout the post-closure care period. These estimates shall be updated yearly and submitted to the Department as part of the annual report described in subsection 6.9.4.

6.10.3.6 A plan for post-closure care of the facility sufficient to ensure that the standards described in subsection 6.10.1 will be met. This will include:

6.10.3.6.1 A description of the monitoring and maintenance activities required and the frequency at which these activities will be performed.

6.10.3.6.2 The name, address, telephone number, and email address of the person or office to contact about the facility during the post-closure period.

6.10.3.6.3 A description of the planned uses of the property during the post-closure period.

6.10.3.7 A plan for control and/or recovery of landfill gases, if appropriate.

6.10.3.8 A topographical map of the site showing the proposed post-closure elevation with reference to mean sea level.

6.10.3.9 A closure construction quality assurance plan.

6.10.4 Minimum closure requirements

6.10.4.1 The permittee shall notify the Department at least 30 working days prior to commencing closure activities. The Department shall inspect the site, and the permittee shall perform any corrective work which the Department deems necessary.

6.10.4.2 Finished portions of the landfill shall receive a capping system which meets the requirements of subsection 6.8.

6.10.4.3 Finished portions of the landfill shall be planted with appropriate vegetation to promote stabilization of the cover.

6.10.4.4 The closure shall be carried out in accordance with the approved closure plan and according to the approved closure schedule. Any significant deviations from the plan or the schedule must be approved by the Department prior to being initiated.

6.10.4.5 Upon closure of an entire landfill, all non-landfilled wastes located on site shall be removed or disposed of in a manner approved by the Department.

6.10.4.6 After closure of the facility, the site shall be returned to an acceptable appearance consistent with the surrounding area and the intended use of the land.

6.10.4.7 Within 30 days of completion of closure of the landfill or a landfill cell, the owner or operator shall submit a final report for the Department's approval, unless the Department approves a longer period of time. The final report shall certify that the closure of the landfill or cell was completed in accordance with the closure plan to include the construction quality assurance plan, construction and material specifications, and design drawings. The final report shall be certified correct by the construction quality assurance engineer, who must be a Professional Engineer registered in Delaware. The landfill or cell will not be considered closed until the Department has provided its written notification that the closure construction and the final report meet the requirements of the Solid Waste Permit and these regulations. The Department will inspect the cell or facility and will either:

6.10.4.7.1 Issue a letter of approval to certify that the site has been closed in accordance with the Solid Waste Permit, the closure plan, and all applicable regulations; or

6.10.4.7.2 Determine that the site is not in compliance with the Solid Waste Permit, the closure plan, or applicable regulations; identify the areas of deficiency; and require the owner or operator to take the necessary actions to bring the site into compliance.

6.10.4.8 Facilities entering the post-closure period will be issued a post-closure permit based upon the approved post-closure plan, monitoring requirements, gas and leachate control, maintenance, and corrective actions (if required).

6.11 Interim-Closure Care

6.11.1 General provisions

6.11.1.1 The owner or operator of an industrial landfill must continue interim-closure care from the time a cell or portion of the industrial landfill is closed in accordance with subsections 6.8 and 6.10 until such time when the Department issues a Closure/Post-Closure Care Permit or a Post-Closure Care Permit.

6.11.1.2 There is no minimum or maximum length of time in which a cell or portion of an industrial landfill can be in interim-closure.

6.11.1.3 At any time during the interim-closure care period, the Department may remove one or more of the interim-closure care requirements described in subsection 6.11 and Section 11.0, Part 3 - Coal Combustion Residuals.

6.11.1.4 If at any time during the interim-closure care period, there is evidence of a contaminant release from the landfill that presents a significant threat to human health or the environment, action to mitigate the threat will be required of the owner or operator of the facility.

6.11.2 Minimum interim-closure care requirements. Interim-closure care shall be in accordance with the Solid Waste Permit and shall consist of at least the following:

6.11.2.1 Maintaining the integrity and effectiveness of the capping system, including making repairs as necessary to correct the effects of settling, subsidence, erosion, or other events, and preventing run-on and runoff from eroding or otherwise damaging the cap.

6.11.2.2 Reseeding the cover if insufficient vegetation exists to stabilize the surface.

6.11.2.3 Maintaining and operating the leachate collection and treatment systems, if applicable, until the Department determines that the leachate no longer poses a threat to human health or the environment. The permittee shall submit leachate quantity and quality data to the Department for those parameters and at such frequencies as specified by the Department.

6.11.2.4 Maintaining and monitoring the gas control system in accordance with subsection 6.5 and the Solid Waste Permit. The permittee shall submit gas data as specified by the Department.

6.11.2.5 Maintaining and monitoring the surface water management system in accordance with subsection 6.6 and the Solid Waste Permit.

6.11.2.6 Maintaining and operating the groundwater monitoring system in accordance with subsection 6.7 and the Solid Waste Permit. The permittee shall submit groundwater quality data as specified by the Department.

6.11.3 Prohibitions

6.11.3.1 Standing water shall not be allowed on closed portions of the landfill for more than 24 hours after a rain event. If standing water reoccurs at the same location after two (2) or more non-consecutive rain events, the owner or operator shall remedy the situation in a timely manner.

6.11.3.2 Open burning shall not be allowed on closed portions of the landfill.

6.11.3.3 Unless approved in advance by the Department, no activity shall be conducted on a closed portion of the landfill which will disturb the integrity of the capping system, liner, containment system, or monitoring systems.

6.11.3.4 Access to the closed landfill by unauthorized persons shall be prevented by the use of barriers, fences and gates, or other suitable means.

6.12 Post-closure Care

6.12.1 General provisions.

6.12.1.1 The owner or operator of an industrial landfill must continue post-closure care for 30 years after the completion of closure.

6.12.1.2 At any time during the post-closure care period, the Department may remove one or more of the post-closure care requirements described in subsection 12.2 below if it determines that the requirement(s) is/are no longer necessary for the protection of human health and the environment. Modifications to the monitoring plan submitted at the time of the application, and all revisions to the monitoring plan, must be certified by a Professional Geologist registered in Delaware or other Department-approved person that the modifications do not cause increased risks to human health or the environment.

6.12.1.3 At any time after the first five years of the post-closure care period, the Department may reduce the length of the post-closure care period or terminate post-closure care if it determines that such care is no longer necessary.

6.12.1.4 Prior to the time that the post-closure care period is due to expire, the Department may extend the post-closure care period if it determines that the extended period is necessary to protect human health and the environment.

6.12.1.5 If at any time during the post-closure care period, there is evidence of a contaminant release from the landfill that presents a significant threat to human health or the environment, action to mitigate the threat will be required of the owner or operator of the facility.

6.12.1.6 A Professional Engineer registered in Delaware must certify that the post-closure care of the landfill has been completed in accordance with the post-closure care plan as part of reducing or ending the post-closure care period.

6.12.2 Minimum post-closure care requirements. Post-closure care shall be in accordance with the post-closure permit and shall consist of at least the following:

6.12.2.1 Maintaining the integrity and effectiveness of the capping system, including making repairs as necessary to correct the effects of settling, subsidence, erosion, or other events, and preventing run-on and runoff from eroding or otherwise damaging the cap.

6.12.2.2 Reseeding the cover if insufficient vegetation exists to stabilize the surface.

6.12.2.3 Maintaining and operating the leachate collection and treatment systems, if applicable, until the Department determines that the leachate no longer poses a threat to human health or the environment. The permittee shall submit leachate quantity and quality data to the Department for those parameters and at such frequencies as specified by the Department.

6.12.2.4 Maintaining and operating the groundwater monitoring system in accordance with subsection 6.7 and the post-closure care plan. The permittee shall submit groundwater quality data as specified by the Department.

6.12.2.5 Maintaining and monitoring the gas control system, if applicable, in accordance with subsection 6.5 and the post-closure care plan. The permittee shall submit gas data as specified by the Department.

6.12.2.6 Maintaining and monitoring the surface water management system in accordance with subsection 6.6 and the post-closure care plan.

6.12.2.7 Other post-closure care requirements specified in the Solid Waste Permit.

6.12.3 Prohibitions

6.12.3.1 Standing water shall not be allowed on the closed landfill for more than 24 hours after a rain event. If standing water reoccurs at the same location after two (2) or more non-consecutive rain events, the owner or operator shall remedy the situation in a timely manner.

6.12.3.2 Open burning shall not be allowed on the closed landfill.

6.12.3.3 Unless approved in advance by the Department, no activity shall be conducted on a closed landfill which will disturb the integrity of the capping system, liner, containment system, or monitoring systems.

6.12.3.4 Access to the closed landfill shall be limited to those persons who are engaging in activities which are compatible with the intended post-closure use of the site.

6.12.4 Post-closure land use. The owner or operator shall implement the post-closure land use plan approved by the Department.

6.12.5 Notice in Deed to Property

6.12.5.1 The owner of the property on which an industrial landfill is located must record an environmental covenant, per Delaware Code Title 7, Chapter 79, Subchapter II, with the deed to the facility property that will in perpetuity notify any potential purchaser of the property:

6.11.5.1.1 The land has been used as a solid waste disposal site, and

6.11.5.1.2 The use of land is restricted under this regulation.

6.12.5.2 Included with the notation shall be a map or description clearly specifying the area that was used for disposal.

6.12.5.3 The Department must be notified in writing that a notation has been recorded on the deed within 30 days of recording a notation on the deed to the property.

8 DE Reg. 354 (08/01/04)
11 DE Reg. 807 (12/01/07)
13 DE Reg. 1093 (02/01/10)
17 DE Reg. 545 (11/01/13)
21 DE Reg. 893 (05/01/18)

7.0 Transporters

7.1 General Provisions (applicable to all persons transporting solid waste in Delaware)

7.1.1 No person shall transport solid waste, without first having obtained a permit from the Department, unless specifically exempted by these Regulations. Refer to Section 4 of these Regulations, PERMIT REQUIREMENTS AND ADMINISTRATIVE PROCEDURES.

7.1.2 Any vehicle used to transport solid waste shall be so constructed or loaded as to prevent its contents from dropping, sifting, leaking, or otherwise escaping therefrom, in accordance with 21 **Del.C.** 4371

7.1.3 The transporter will be responsible for all costs of cleaning up a discharge of solid waste from the vehicle.

7.1.4 Compliance with these regulations does not release a transporter from the obligation of complying with any other applicable laws, regulations or ordinances.

Additional waste transporter regulations may apply to transporters of special wastes, e.g. infectious waste. Refer to Section 11 of these Regulations, SPECIAL WASTES MANAGEMENT.

7.1.5 Each vehicle used to transport solid waste and required to have a transporter's permit must carry a copy of the permit in the vehicle. The permit must be presented upon request to any law enforcement officer or any representative of the Department.

7.1.6 A written request to transfer a permit must be received 90 days prior to the date of the proposed transfer. For permit transfer procedures, refer to Section 4.1.8 of these Regulations, PERMITTING.

7.1.7 Permitted solid waste transporters shall not use agents or subcontractors who do not hold permits for transporting solid waste.

7.2 Provisions Applicable To Transporters Required To Have A Solid Waste Transporter's Permit

7.2.1 Applicability. Section 7.2 applies to all transportation activities in Delaware except the following:

7.2.1.1 Transportation of household waste generated in a Delaware residence and transported by the generator of the household waste or transported in a non-commercial capacity, in a vehicle having a gross vehicle weight less than or equal to 26,000 (twenty-six thousand) pounds.

7.2.1.2 On-site transportation of solid waste (i.e., the point of generation and the point of treatment or disposal are on the same site and the vehicle transporting the solid waste will not at any time leave the site).